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ABSTRACT

This report compares five information-gathering efforts sponsored by the Dissemination and Resources Group of the National Institute of Education. These five activities were R&D System Monitoring--examining the structure, activities, funding, and communication flow at the systems level; Information Needs Sensing--identifying the information needs of educational information users and assessing how well those needs are being met by existing information services; Evaluation of the State Capacity Building Program--determining whether dissemination capability is being built and if access to information is increasing; Feedforward--attempting to identify information needs of educational practitioners; and Evaluation of the Research and Development Utilization Program (R&DU)--assessing the effectiveness of the R&DU program as a problem-solving/dissemination arrangement. The 64-item bibliography which is attached provides separate listings for each of the activities. (RAO)

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PROGRAM INTELLIGENCE ACTIVITIES IN EDUCATIONAL KNOWLEDGE UTILIZATION: COMPARISONS OF SENSING, FEEDFORWARD, MONITORING, AND EVALUATION CONCEPTS AND ACTIVITIES IN FIVE NIE-SPONSORED PROGRAMS

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PREFACE

This report compares five separate information-gathering efforts that were sponsored by three divisions of the Dissemination and Resources Group (DRG) of the National Institute of Education. The five activities were:

R&D System Support Division

- R&D System Monitoring

Information and Communication Systems Division

- Needs Sensing; ERIC acquisition and usage
- Evaluation of the State Capacity Building (SCB) Program

School Practice and Service Division

- Feedforward
- Evaluation of the Research and Development Utilization (R&DU) Program

Because all these information-gathering efforts are highly dynamic and yet responsive to particular information needs and programmatic contexts, many persons in the field and perhaps some at NIE are generally uninformed about the intents, approaches, and potentials. The original motivation for this analysis arose because Far West Laboratory staff had been closely involved in some significant way with each activity and were therefore able to develop a perspective that crossed DRG divisional and program boundaries. Specific Far West Laboratory staff participation includes:

R&D System Monitoring. Subcontract to the Institute for Communication Research, Stanford University, to provide technical support for the compilation of available quantitative information and preparation of the NIE 1976 Databook: The Status of Education Research and Development in the United States.

Sensing. Participation with the System Development Corporation and Applied Communication Research in the "Study of Information Requirements in Education." This study included conduct of a nationwide sampling survey of the information needs of 14 major educational audiences and development of a design for a national information needs assessment.

SCB Evaluation. Member of the Advisory Council on the "Evaluation of the State Capacity Building Program."

Feedforward. R&D Exchange Data Management Contractor and System Support Service; responsible for developing and coordinating RDx system-wide feedforward activities.

R&DU Evaluation. Evaluation technical assistance contractor for the R&DU Program (1976-77) and currently member of the R&D Study Advisory Council.

A recent NIE program reorganization promises to reduce some of the previous divisional separation by bringing exploratory studies and evaluations, including the SCB and RDU evaluations, together in one program (Program on Research and Educational Practice); however, both the Regional Program and the Information Resources Program will continue to be associated with activities involving need sensing, formative evaluation, and other forms of management data. Hence, opportunities for enhanced staff awareness and coordination still exist at NIE, as well as in the field. Because of marked differences in type of approach and stage of development, as well as uncertainties about future data-gathering efforts, the current analysis is focused primarily at the conceptual level. This analysis should be considered as an orientational overview rather than as a detailed comparative analysis of the specific design, variables, or methods of analysis.

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June 1978

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BACKGROUND

Introduction

In the past few years there have been (and continue to be) several major efforts by NIE and others to collect information on educational dissemination. These efforts represent different approaches and emphases. Some focus on the characteristics, behavior, and needs of educational practitioners and other educational information users; some focus on the characteristics and functions of knowledge producers; some focus on the disseminators of information who link knowledge producers and users; whereas others study the mechanisms and processes of information exchange. Though each information-gathering or intelligence-gathering effort seems to produce a different terminology implying a separate domain of study, careful analysis of each suggests considerable complementarity. With that possible complementarity in mind, we felt it would be useful to describe and compare five of the major ongoing NIE-sponsored studies of educational dissemination. In the following pages, "needs sensing," "feedforward," "monitoring," and two evaluation studies (the Abt evaluation of the Research and Development Utilization Program and the NTS evaluation of the State Capacity Building Program) will be described first as theoretical concepts and then as they are functioning. Similarities and differences in these various approaches will be identified, and suggestions will be made as to fruitful areas or avenues of exchange.

Definitions

Before describing each of the five NIE activities, we feel it may be useful to define some terms. Data are coded symbols, signs, or numerical indicators, or the unprocessed stimuli that are "raw" data. Information is data that has been subjected to some form of processing (e.g., recoding, summarization, collation). Intelligence consists of information that has been communicated to others, usually with an accompanying interpretation or evaluation of meaning or pertinence. Technology transforms information and produces products, processes, or programs that can still be regarded as information-bearing. Knowledge refers to the total body of data, information, intelligence, and technology and their organizing structures and principles (i.e., the sum of all that is known). Knowledge production and utilization (KPU), as a field of study, is concerned with examining the processes of knowledge development, dissemination, and implementation; with identifying the factors that account for the character and timing of production, diffusion, and utilization processes; and with developing strategies and tactics to foster appropriate, timely, and effective utilization. Knowledge transfer is sometimes used as a completely synonomous term with knowledge utilization, but in other uses is confined to the communication/dissemination/diffusion phases of the KPU process (thus excluding production and sometimes the incorporation and adaptation phases of the utilization process). R&D-based KPU focuses on the production and utilization of knowledge that is derived through the processes of disciplined inquiry (e.g., through research or development activities).

NIE-Sponsored KPU Programs

Because the National Institute of Education is the primary federal agency for sponsorship of educational research and development, it has a special

interest in R&D-based KPU; however, its interests extend to all forms of KPU that may provide a reliable basis for school improvement.

NIE sponsors a large number of programs and projects that are directed toward strengthening the capability within the nation for high-quality educational research and development and for dissemination and utilization of the products of educational R&D for the improvement of education practices throughout the country. This analysis focuses only on a selected set of programs and projects that are located within the NIE Program for Dissemination and Improvement of Practice (previously the Dissemination and Resources Group). Besides the R&D system monitoring studies, four major operational dissemination programs are of specific interest: the Educational Resources Information Center (ERIC), the State Dissemination Capacity Building Program (SCBP), the Research and Development Utilization Program (R&DUP), and the Research and Development Exchange (RDx). Associated with each of these operational dissemination programs is some form of information-gathering or evaluation effort. Although the purposes and methods vary, all may be considered to be forms of intelligence systems that are designed to impart interpreted or evaluated information to various audiences. Before we examine these intelligence efforts, it may be useful to describe the programs.

ERIC. The Educational Resources Information Center network includes 16 ERIC Clearinghouses that are responsible for acquiring and processing for input into the ERIC data base significant educational reports and journal literature within their particular areas; for providing information analysis products (e.g., bulletins, interpretive summaries, research reviews, bibliographies); and for providing a number of other user services. The ERIC Processing and Reference Facility provides a centralized information-processing facility

serving all components of the ERIC network. Services provided include: data preparation, computer programming and processing, system and file maintenance, data base management, authority list maintenance, and reference responses. The Facility prepares and delivers a variety of products and publications derived from the ERIC data base. The ERIC Document and Reproduction Service (EDRS) provides microfiche and paper copy of most of the documents announced in Resources in Education (RIE), a monthly abstract journal printed by the Government Printing Office that contains summaries of education-related documents and indexes. The Current Index to Journals in Education (CIJE) published by Macmillan Information Service announces and indexes articles from more than 700 education and education-related journals. NIE staff provides for overall planning, management, and coordination of the ERIC network, including developing, testing, and implementing national bibliographic files that specifically address new information needs. Indirectly associated with ERIC is a very large number of ERIC product and data base users, including more than 200 organizations throughout the world that provide on-line computer access to the ERIC data base.

Because ERIC was developed as a decentralized network, it is not surprising to find that user needs sensing is also decentralized. ERIC data base users, the Clearinghouses, EDRS, and the NIE staff are all engaged in various forms of user information needs sensing.* Sensing data are collected to identify topics and relevant content coverage for which information is needed; to describe and analyze information-seeking and information-using behavior and product and services preferences of various types of information users; and

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* If the definitions given on p. 2 are employed, "knowledge needs sensing" would more correctly convey the total scope that is of interest; however, "information needs" of users is often the major focus.

to assess the utility of information products and services. Sensing data are converted to the marketing intelligence that enables NIE and the field to modify and improve existing knowledge products and services and to determine what new products and services are required.

State Dissemination Capacity Building. This is the most visible part of a larger NIE effort toward building capability for more effective knowledge dissemination and utilization throughout the educational system. State Capacity Building is a grant program, initiated in FY 1975, that provides support for three to five years for each state educational agency (SEA) that chooses to participate in the program to build comprehensive and continuing dissemination capability. States may compete for one of two types of grants. Special Purpose Grants support low-cost, one-time efforts related to specific aspects of an SEA's approach to developing state dissemination capability. Capacity Building Grants provide longer-term support for building a generalized and comprehensive set of resources, including data, documents, products, and technical expertise; means of linking client groups to the resource base; and leadership and management arrangements within the SEA and the state to provide for maintenance and enhancement of dissemination services. Currently 29 states are Capacity Building grantees. It is anticipated that additional states will apply for Capacity Building grants.

The NTS Research Corporation of Durham, NC, is the SCB evaluation contractor. This evaluation confronts two overarching questions: (1) Is dissemination capability being built? If so, how? (2) Is the State Capacity Building Program having an effect? If so, what is the nature of the effect? The current organizing framework for the SCB evaluation is the product of an 11-month design phase and eight additional months of design refinement

activities that have involved NTS and NIE staff, as well as representatives of all SCB project grantees.

R&D Utilization Program. The purpose of the R&DU Program is to provide services that help schools use R&D-based innovations that improve educational practices. The program's orientation is action research; about 80 percent of the effort supports activities providing direct services to schools, whereas about 20 percent is used to study these activities so as to affect other ongoing federal and state R&D utilization efforts. The R&DU Program includes seven field projects that link resources of SEAs, local education agencies (LEAs), regional laboratories and centers, intermediate educational agencies, and institutions of higher education to LEAs and selected school sites with locally-identified problems so as to assist them in systematically analyzing and resolving these problems by using R&D-based solutions and problem-solving processes. R&DU evaluation data collection exists at several levels and serves different purposes. At the site level, it is used for planning and review of individual site activities. At the project level, it is used for management review, quality assurance, formative evaluation of project products and services, and documentation. Site- and project-level evaluation is accomplished by evaluation staff or subcontractors associated with each of the seven R&DU projects, as well as by the R&DU Program study contractor. At the cross-project level, the evaluation is used for both formative and summative purposes that include concerns related to policy, management, and research audiences. During the initial 18 months of the R&DU Program, cross-project evaluation was accomplished through the joint efforts of NIE and R&DU project staff, with technical assistance provided by the Far West Laboratory. The current R&DU Program study contractor is Abt Associates, Inc., of Cambridge, MA.

R&D Exchange. The R&D Exchange is a collaborative effort among nine R&D centers and laboratories designed to communicate the results of R&D to educational practitioners and to provide practitioners with a mechanism for communicating their needs and concerns to educational researchers, developers, and disseminators in order to influence future R&D and in order to provide for its timely and effective delivery. Because this forwarding of information concerning practitioner needs must be proactive and selectively targeted to specific RDD&I audiences, the term feedforward was selected to distinguish the intended communication function from the perhaps more passive and less selectively targeted concepts of "needs sensing" or "feedback." Currently, seven Regional Exchanges serve a total of 39 states. The Regional Exchanges are augmented by four central support services that provide information referral, consumer-oriented R&D interpretations, dissemination support and training, and systems coordination and public information services to the RDx network. Like the ERIC sensing activities, the RDx feedforward activities are distributed among the various RDx components. RDx System Support Service, located at Far West Laboratory, coordinates RDx feedforward activities.

Understanding Processes and Systems for Using and Producing Knowledge. In addition to the four operational dissemination programs described above, the NIE Program for Dissemination and Improvement of Practice, through its subordinate Program on Research and Educational Practice, conducts a number of exploratory studies, surveys, policy and planning studies, and formal evaluations. The evaluations of SCB and RDU are now part of this latter program. This program is able to build on R&D system monitoring work accomplished during several preceding years by the DRG R&D System Support Division. These R&D system monitoring activities were aimed at increasing the body of knowledge regarding the structure and communication flows within the educational

knowledge-producing and -using systems. This previous work includes the following sponsored projects:

R&D Data. William Paisley and associates at the Stanford University Institute for Communications Research completed a systematic compilation of available quantitative information. Their investigations showed that many needed data series were of questionable validity and that others were simply unavailable. Furthermore, gross differences in definitions, sampling, and frequency of collection made integration and interpretation of existing information unusually difficult. Still, the resulting Databook, a joint reporting activity with NIE, and associated Technical Report are among the more comprehensive and up-to-date sources of information on what is currently known about the educational KPU system.

Public Policy Regulators. O.W. Markley and associates at the Stanford Research Institute devised a conceptual framework for thinking about administrative and legal regulators affecting educational KPU and assembled information on their nature and effects.

Research on Institutions of Teacher Education. David Clark and Egon Guba at Indiana University headed a team that explored the present roles and likely future patterns of schools, colleges, and departments of education (SCDEs) in R&D and planned change.

Contextual Analyses for Policy Studies of the Education R&D/I System. Michael Radnor and associates at Northwestern University completed a series of studies that drew implications for educational KPU from experiences in managing research in agriculture, aerospace, and other areas. This perspective was then applied to a policy analysis of regionalism in educational research, development, and innovation and to an examination of conceptual and implementation issues of a regionally-based nationwide system for information dissemination and exchange of education innovations.

Registry of Research Organizations in Education. NIE staff are working closely with the Bureau of Social Science Research, Washington, DC, to accomplish a survey of institutions which perform educational research, development, dissemination, and evaluation and policy studies (RDD&E). The immediate objective of the survey is to compile a registry of organizations that perform RDD&E and to gather and analyze information describing these organizations in terms of general characteristics, funding for RDD&E, personnel, organization, and projects. The longer-range aim is to develop the capability to produce periodic analytic and descriptive reports on the structure and capability of the educational RDD&E organizations in the United States.

R&D Funding Studies. In addition to the previously described external studies, the R&D system monitoring studies have included a series of studies of federal and foundation funding support for educational KPU. These studies analyze allocation of funding in

terms of KPU functions, project content, type of performing organization, and sponsoring agency.

Taken together, these studies constitute the core of the R&D system monitoring effort.

A Framework for Comparing KPU Program Intelligence Activities

Figure 1 presents an outline of the major topics and sources of information that could be collected in a study of the educational dissemination process. This outline provides the framework by which the major information collection emphases of the five studies/efforts will be identified and compared.

Figure 1

A FRAMEWORK FOR COMPARING EDUCATIONAL KPU INTELLIGENCE ACTIVITIES

A) Characteristics and needs of educational knowledge users

B) Characteristics of knowledge producers

1. Available knowledge and knowledge production capability
2. Characteristics and constraints (e.g., organization, structure, interests, preferred way to receive communication from users) influencing knowledge production activity

C) Characteristics of knowledge distributors (e.g., ERIC, SEAs, LEAs)

1. Activities and methods of distribution
2. Characteristics and constraints (e.g., organization, structure, style, resources) influencing distribution activities and methods

D) Use of R&D by educational knowledge users

1. Extent and method of use
2. Characteristics and constraints (e.g. organization, barriers to change) influencing use of R&D

In addition, information could be collected concerning the links or communication flows among these various components of the dissemination process:

A → B Communication of user needs to knowledge producers

A → C Communication of user needs to knowledge distributors

B → C Communication of knowledge from producers to distributors

B → D Communication of knowledge from producers to users

C → D Communication of knowledge from distributors to users

D → B Communication of information about use of knowledge from users to producers

D → C Communication of information about use of knowledge from users to distributors

DESCRIPTION OF PROGRAM INTELLIGENCE ACTIVITIES

Information Needs Sensing

In order for funders and managers of information services to make informed decisions about the resources and services which would be most useful to educational information users, some input from users about their information needs would seem to be essential. Historically, however, such decisions have usually been made by individual information service managers on the basis of their own judgment with very limited feedback from the actual clients of educational dissemination programs. In the belief that such feedback could increase the use and usefulness of information services, the concept of "needs sensing" developed. Although "needs sensing" refers (as the words suggest) primarily to identifying the information needs of educational information users, it also includes assessing how well those needs are being met by existing information services. "Needs sensing," then, is the sensing or identification and assessment of the information needs and need fulfillment of educational information users so as to provide intelligence that can be used by information service managers to better serve their users. Although the emphasis is on gathering information from users of information services (in order to determine the usefulness of existing information services), information is also sought at the federal, regional, and state levels on the dissemination capability and methods of those information services. The list on the following page summarizes the types, sources, and consumers (targets) of information that have been collected under the rubric of "needs sensing." (Note: The following lists use the framework presented in Figure 1.)

A) Needs of educational information users for information and products

- Topic or problem areas of concern
- Preferred format, form (e.g., reviews, syntheses, raw information), packages, channels

C) Characteristics of information distributors (i.e., ERIC network)

- Type of information and products available
- Dissemination methods used, adaptability to changing needs
- New information technology which could be used to improve information dissemination

D) Use of R&D by educational information users (i.e., ERIC clients)

- How and how well do clients use system?
- Does use of system fulfill their needs for educational information?

All this information is required by NIE and information service managers to help them make decisions about funding and development of resources and services to improve the usefulness of information services to the educational information users.

In the past few years several studies and surveys of educational information users and information services have collected some of this information on a one-shot basis. For each of the three main types of "needs sensing" information outlined above, key studies or surveys designed to gather that type of information are briefly described below. Other pertinent studies are referenced at the end of this paper.

A) Needs and preferences of educational information users for information

Hood, P. and Blackwell, L. (1976) and Hood, Mick, and Katter (1976), The Educational Information Market Study. Field interviews and a mail survey, respectively, collected information from a variety of educational information

user subaudiences (e.g., teachers, administrators, school board members, legislators) concerning, among other things, their purposes for seeking information and the sources preferred for different purposes.

Hull and Wanger (1972), ERIC File Partition Study. Part of this study involved a questionnaire given to educational information users (including researchers as well as practitioners) designed to determine the information needs for subject areas, preferred document types, and purposes for obtaining information. Suggestions were solicited from users and nonusers of ERIC as to the most useful types of products and services ERIC could provide.

C) Characteristics of R&D distributors (e.g., ERIC)

Hull and Wanger (1972). Another aspect of this study involved analysis of the organization of knowledge (i.e., use of descriptors, file partitioning) in the ERIC system. This was accomplished by analysis of files and interviews with ERIC personnel.

Katter and Hull (1976), Survey of Educational Information Services. This study involved on-site interviews with managers of a variety of types of education information services to collect information on many aspects of the characteristics, operation, functions, procedures, and service orientations of those sites (e.g., information was gathered concerning activities, funding, staffing, constraints, inter-organizational communication, purposes, communication with clients).

D) Use of R&D by educational information users

Fry (1972), Evaluation Study of ERIC Products and Services. This study of the ERIC system collected information from users on the extent of use of ERIC, how and how frequently descriptors were used in accessing ERIC information, and the extent to which information needs were met by ERIC.

Wanger (1972), Evaluation Study of NCES Information Analysis Products. This study of NCES information analysis products assessed the familiarity of users with these products, users' purposes and methods of use, and their judgments of the products' quality.

Most information services and ERIC clearinghouses operate informal needs sensing operations. An important effort of ERIC clearinghouse staff is producing information analysis products which are based on user needs identified through: (1) analysis of user requests to ERIC for information; (2) needs statements of states, school districts, and professional associations; (3) occasional surveys of users; (4) discussions and meetings with users, especially those on ERIC advisory boards; and (5) review of pertinent literature.

Katter (1975) claims that except for infrequent and expensive surveys of clients of particular programs and/or educators in general, no mechanism has ever been available for providing feedback from actual or prospective clients to the managers of dissemination programs regarding either the performance of existing services or the experimental provision of new services.

A "sensing mechanism" to strengthen this feedback was first proposed to USOE by Mick and his associates in 1971. USOE funded an exploration of methodological alternatives for collecting feedback within certain parameters relating to cost, timeliness, administrative feasibility, etc. Five alternative methods were field tested (Mick et al., 1972). The first study suffered from three major limitations:

1. It emphasized clients' perceptions of topics of needed information to the exclusion of most other variables relating to the performance of educational dissemination programs.

2. It did not match its variables with the range of decisions that dissemination managers are responsible for (e.g., it left unanswered a number of questions relating to clients' satisfaction with existing services and probable acceptance of future services).

3. It failed to specify the mechanisms for converting raw data to program intelligence.

NIE later provided an opportunity to redesign a "sensing network" to overcome these limitations (Mick, 1975).

Mick identified a set of 24 sensing network requirements (e.g., should be incremental so that expansion is possible without redesign; should be able to meet changing requirements and conditions; must have the involvement of state-level agencies and linking organizations; should collect some data directly from clients; should use a variety of data collection techniques to avoid possible bias). Several different sensing network user groups were identified and their information needs were described, including: policy formulators, information system and service builders, system and service operators, R&D personnel, and faculty and administrative personnel in schools of education. Mick suggested that the sensing network should focus on two major perspectives in terms of the dissemination system: the perspective of the client (how well is the system serving clients) and the perspective of the system itself (what is the system doing). Because the sensing network is planned to be able to react to changing conditions, needs, funds, priorities, etc., a process for identifying and fine-tuning topic areas was specified. Mick provided a beginning list of general topic areas posed as management intelligence questions:

1. What information or problem topics are of interest to which client groups?
2. What is happening in educational legislation and policy?
3. What is currently available in the educational resource system?
4. What is happening in information technology that could affect educational dissemination?
5. What does the current research say about behavioral aspects of information-seeking which could be utilized to improve educational dissemination?

6. What channels are most effective for reaching which client groups?
7. What services do which clients want?
8. What form is best for packaging what kinds of services for which clients?
9. What are the information-related behaviors of which client groups?

Note that whereas questions 1, 2, and 6-9 may require information about client groups, questions 3, 4, and 5 are distinctly different in orientation.

Mick outlined an ambitious data collection program in terms of two variables--periodicity (freqency of data collection) and scope (nature and size of audiences or area in which data is collected) and recommended four basic types of efforts: (1) a comprehensive five-year survey based on relatively large samples and designed to provide for longitudinal comparisons of key variables; (2) a "ten-question," semi-annual, small sample survey to provide data on just a few policy-relevant client and system variables; (3) "the crucial question" episodic survey that would be conducted whenever dissemination managers need immediate feedback on a crucial decision affecting clients; and (4) continuous data collection that would be provided by various means of monitoring dissemination operations (e.g., analysis of sample of information requests).

Due to several factors (e.g., costs, uncertainty about actual benefits from information obtained, need to obtain federal and state clearances for data collection, lack of specific operational guidelines for implementing the network), NIE has not attempted to implement the proposed sensing network. However, the ERIC Clearinghouse on Information Resources (ERIC/IR), School of Education, Syracuse University, is now studying more modest and less costly alternatives for compiling and coordinating some needs sensing information,

primarily concerning ERIC usage, throughout the ERIC system. These ERIC usage questions include:

1. Who is using ERIC products and services?
   - By role (e.g., how many teachers, how many administrators?)
   - By product and/or service (e.g., how many people use standing order collections, RIE, information analysis products?)
   - Socio-demographic patterns of use (e.g., where is heaviest usage taking place--in densely or sparsely populated areas; in affluent or poor areas?)
2. How is ERIC being used?

   Examples:
   - To complete coursework (e.g., assigned papers)
   - To perform work-related duties (see Hood et al., 1976, for typology)
   - To write speeches or proposals, to win arguments, to look for ideas
3. How frequently do users access the system?
   - Typical cases (teachers use one time per year; researchers use 3-5 times per year)
4. In what subject areas are users searching ERIC?
   - Most frequent categories (e.g., in 1978, administrators' search for information on collective bargaining; minimal competency and basic skills)
5. How does actual usage compare to the universe (market penetration)?

   Examples:
   - How many teachers use ERIC compared to total number of teachers?

If the ERIC/IR staff can identify an attractive cost-beneficial alternative, there is some hope that the beginning of a coordinated sensing network may be established around these more modest efforts to compile ERIC usage information.* Unless and until this happens, information needs sensing will

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* Usage data may be employed to make inferences about needs as well as need fulfillment; however, the findings pertain only to classes of actual users of specific products or services and the data content is too limited (see above) to answer many questions, especially those concerning need fulfillment.

remain a highly idiosyncratic and independent effort of local information service managers.

Because of the conceptual similarities of ERIC sensing to RDx feedforward, we next examine this intelligence activity.

Feedforward

In order for R&D outcomes to be more accessible, relevant, and effective for educational practitioners, practitioner (and linker) needs must be communicated to the sponsors and producers of R&D. The simplest conception of "feedforward" is the communication from educational practitioners of their educational needs to the sponsors, producers, and disseminators of R&D. At this level, the concept of "feedforward" is very similar to that of "needs sensing" in that both involve the communication of user needs to those knowledgeable about educational R&D. However, even at this level there are some differences between the two concepts: (1) "feedforward" is more restricted in scope in that the information users of concern are limited to educational practitioners (other knowledge users such as legislators, researchers, and school boards are not specifically included); (2) in feedforward, intelligence regarding user needs is communicated to R&D sponsors, producers, or disseminators, whereas in needs sensing it is communicated only to the disseminators of R&D (e.g., information services such as ERIC); (3) in needs sensing, the information disseminators are the initiators of the action, seeking information about user needs so that their organization and dissemination of information will be more helpful to those users, whereas in feedforward the initiators of the action are not the R&D community seeking to make R&D outcomes more useful, but are putatively the users (with the help of the R&D Exchange) attempting to influence the R&D community to produce more useful products and

information or to influence the dissemination community to make those outcomes more accessible. This emphasis on affecting and influencing the production and delivery of R&D outcomes is a very important aspect of feedforward, for it greatly extends the scope of feedforward beyond just user needs to the consideration of the needs, preferences, and resources of the R&D community as well. In order to communicate user needs in such a way so as to influence the R&D community, one must know the methods of communication most likely to be responded to, the topic areas of most interest to the R&D producers, and the resources and constraints influencing the capability of the R&D community to respond. In addition, in order to influence the R&D community to produce and deliver R&D outcomes which are more useful and effective for educational practitioners, one must know how and how well those practitioners use R&D outcomes. Despite these important differences, it can be seen that feedforward in its broadest sense is similar to needs sensing in its broadest sense, for in both cases information must be gathered about: (1) the needs of educational information users; (2) the resources, constraints, and preferences of R&D producers or disseminators influencing their capacity to respond to user needs; and (3) the use of R&D by the educational information users. We have already pointed out differences between feedforward and needs sensing regarding the types and scope of concern of users, the segment of the RD&D community which receives the needs information, and the initiators of the communication of information.

The following list summarizes the types, sources, and users (targets) of information which would be collected under this broad concept of "feedforward". (Note: The following list uses the framework presented in Figure 1.)

A) Needs of educational information users (limited to educational practitioners) for information and products

- Topic areas of concern
- Preferred forms of information, technical assistance, etc.

B) Characteristics of R&D production system

- Capability of R&D community to respond to practitioner needs
  - Existing R&D outcome inventory; topic areas where there is deliverable expertise
  - Constraints, resources, organization, policy restricting response capability
- Preferences of R&D community affecting response likelihood
  - Topic areas of interest
  - Types and methods of communication likely to influence R&D community

D) Use of R&D by educational information users (limited to practitioners)

- Capability of practitioners to use R&D-based knowledge
  - Readiness, constraints, resources, organization enabling or restricting use capability
  - Forms of R&D most likely to use
- How and how well various types of R&D outcomes are used by practitioners

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In addition, the broad concept of "feedforward" implies a strong emphasis on collecting information about the communication of user needs to R&D producers (A → B) and the timely and relevant responding communication of relevant R&D from producers to users (B → A).

The feedforward effort was operationalized in 1977 as a primary function of the Research and Development Exchange (RDx). Currently, seven Regional Exchange sites and four national function components act as intermediaries to communicate the needs of educational practitioners for information and products to those responsible for R&D production and delivery in such a way as to influence the latter to provide more useful and accessible R&D outcomes. For each of the three main types of information included in feedforward which were outlined above, the methods proposed by the RDx feedforward system for gathering that type of information are briefly described below. (Note: The following list uses the framework presented in Figure 1.)

A) Needs of educational practitioners for information and products

- Secondary analysis by RDx System Support Service or regional feedforward studies and synthesis of needs assessments from states in each RDx region
- Needs identified by Regional Advisory Board (consisting of key practitioners) for each Regional Exchange
- Dissemination baseline: Each Regional Exchange collects information from state and other educational agencies concerning information, training, and technical assistance needs of dissemination and linkage personnel
- Analysis of RDx transaction logs for number and types of requests for information by practitioners

C) Capability and preferences of R&D distributors

- Baseline: Each RDx collects information from states (SEAs) on organization, structure, and capability of state and intermediate agencies to disseminate R&D outcomes to practitioners
- RDx Resource Referral Service compiles and distributes lists resources available for identified practitioner needs and monitors requests for referral services and analysis
- RDx requests to national Research Development Interpretation Service for synthesis of R&D relevant to identified practitioner needs

D) Use of R&D by educational practitioners

- Baseline: Each RDx collects information from states (SEAs) about practitioner use of R&D distributed by SEAs and ISAs
- Tracking of R&D use, including telephone surveys of distributors of R&D on what is distributed to whom, consumer surveys about awareness and use of R&D, and questionnaires to linking agents about dissemination and use of R&D

It should be noted that there is currently no proposed gathering of information from the producers of R&D, either on their capability to respond to practitioner needs or on the types of communication most likely to receive a response. This omission would seem to be serious, given that the goal of feedforward is to communicate practitioner and linker needs to the R&D community with the intent of influencing the character and responsiveness of R&D activity. There is also no currently proposed gathering of information on the communication process either from user to producer or from producer to user.

In practice to date, the information gathered by the RDx feedforward system has been much more limited than the preceding list would suggest: (1) tracking of R&D use has been discontinued until a time when new R&D is produced in response to practitioners needs, so the only information being collected on R&D use is "baseline" data from SEAs about their perceptions of practitioner R&D use (some documentation on practitioner evaluation of RDx workshops in which practitioners receive help in finding and using R&D is available, but has not yet been synthesized); (2) the Resource Referral Service and the Research Development Interpretation Service are peripherally involved in the RDx feedforward system and are more concerned with responding to specific practitioner requests than in determining the general capability of the R&D community to respond; the only significant information being

collected on R&D response capability is "baseline" data from SEAs about their (and ISA) organization and resources for R&D dissemination (as previously mentioned, no attempt is being made to collect information on the constraints, resources, organization, knowledge, or preferences of the R&D producers which could influence their capability and probability of responding to practitioner needs); and (3) most of the information-gathering focuses on practitioner needs, but only as those needs are perceived by state personnel (SEAs) or ISAs (the RDx Advisory Boards consist of SEA and ISA members; the baseline data is gathered by each Regional Exchange from SEA personnel). The secondary analysis of state-conducted needs assessments of practitioners has encountered great difficulties, e.g., lack of comparability across needs assessments and dated information focused in a narrow manner that makes generalization difficult.

It has been noted that no information is currently being collected from R&D producers, but even more important, perhaps, is the fact that, to date, no information about practitioner needs is being communicated to R&D producers. Partially because of uncertainty as to who the relevant R&D performers would be, the feedforward effort to date has not been well targeted. Thus, feedforward, even in the narrow sense of one-way communication of practitioner needs to R&D producers, is not being realized. In practice, the feedforward system or network to date strongly resembles a needs sensing (in the narrow sense of of identification of user needs) system, except with a focus on educational practitioners and a regional exchange structure. Perhaps the most marked successes have occurred where Regional Exchanges have been able to influence RD&D activities in their own regional laboratories or in other dissemination projects in their own region. Future plans for the feedforward system call for targeting needs information to R&D funders at NIE and OE.

Evaluation of the State Dissemination Capacity Building Program

The purpose of this program, established by NIE in FY 1975, is to build comprehensive dissemination capabilities within states by developing within SEAs a comprehensive set of knowledge resources, means of linking educational client groups within the resource base, and leadership and management arrangements which facilitate the provision of such services. The main purpose of the evaluation of this program by NTS Research Corporation, Durham, NC, is to determine whether a dissemination capability is being built and whether the attempt at building capability is increasing access to and use of educational information by educational information users. The focus of the evaluation is on the dissemination capability and methods of SEAs, and user utilization and satisfaction with information delivery. The current evaluation framework conceptualizes "dissemination capacity" as consisting of two related components: "service capacity" and "user capacity". Service capacity is defined in terms of contextual, system characteristics, and outcome variables in the following domains: leadership/management, information resources, linkages, and clients. User capacity is subject to further design work, but will probably include contextual, client characteristics, and client outcome variables.

Unlike sensing and feedforward, the purposes and audiences are more specifically defined for the SCB evaluation. The data collected will be used by NIE for purposes of policy and program planning and development in the area of dissemination. The results are expected to provide Congress and other federal and state decisionmakers with an evaluation of the effectiveness of the SCB program in building state capability and to provide information or technical assistance to various educational audiences, especially SCB project directors and other SEA leaders. State educational agencies have indicated

that the data will be useful for their own internal evaluations and for dissemination program planning. Client assessment information will fill a void in some states, will supplant present instrumentation in other states, and may provide a standardized assessment mechanism that could significantly increase the scope and quality of available information "needs sensing" data.

The study is longitudinal and will continue for several years. Primary sources of information include: (1) NIE and state SCB documentation; (2) interviews with NIE personnel; (3) interviews and questionnaires of state project directors; (4) validation telephone interviews with heads of information resource centers and linking agents; (5) structured interviews with a sample of SEA officials; and (6) longitudinal surveys of users. The evaluation also includes a technical assistance component that facilitates communication among all the evaluation participants.

The evaluation questions will be examined at three levels: project, SEA, and state. During the first year of data collection (Fall 1978 - Spring 1979) the primary focus will be at the project level, although in cases where the project and the SEA are coterminus, the SEA level will be included. In subsequent years the SEA level and then the state level will be added.

Although the evaluation design encompasses an imposing list of specific questions, variables, and data points, its general focus can be summarized by the following primary evaluation questions:*

State Dissemination Capacity

1. What knowledge can be generated regarding the origins, objectives, and plans of the Capacity Building projects?
2. What knowledge can be generated concerning service capability (including resource base and linkage between clients and resource base)?

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* Readers desiring more detail should consult the Request for OMB Clearance (NTS Research Corporation, 1978).

3. What knowledge can be generated concerning user capability (to acquire and use knowledge)?

4. How good a match is there between service capability and user capability?

SCB Program Effects

1. What are the effects of the projects on SEA and state dissemination efforts?

2. Is dissemination capacity being institutionalized so that it can continue to function without external stimulus?

3. What effects are related to the federal role?

The list below summarizes the types and sources of information NTS will collect in their evaluation of the State Capacity Building Program in terms of our framework (see Figure 1).

C) Characteristics of R&D information distributors (i.e., SEAs)

- Contextual and system characteristics regarding leadership and management, information resources and linkages
- SEA capability to respond to information requests, link users with resources, develop comprehensive dissemination programs
- Methods of search for and delivery of information
- Experience, background, demographic data on linking agents (SEAs)

D) Use of information by educational information users

- Description by user class of purpose and method of use
- User evaluation of needs satisfaction

C → D) Communication of information from distributors to users

D → C) Client assessment

- Description of user request; of content, form, and type of response to user request; user assessment of relevance and quality of response

Evaluation of the R&D Utilization Program

The Research and Development Utilization (R&DU) Program, sponsored by NIE, includes seven field operations or projects which provide services to help practitioners (schools) select and use R&D-based innovations to improve educational practices. Besides their similarity in focusing on services designed to improve the use of R&D outcomes, the projects are alike in delivering most of their services through intermediate service agencies--usually working with or through a state education agency.

The main focus of the evaluation of this program by Abt Associates (building on the first-year evaluation by Far West Laboratory) is on the dissemination activities and tactics of the deliverers of educational information; the organization, context, attitudes, and other characteristics of the practitioners that could constrain or facilitate the use of R&D outcomes; and the relationships between these user characteristics and disseminator tactics. The Abt study represents an unusual effort to increase significantly the store of relevant information about the design, operation, and outcomes of dissemination programs (R&DU and others) in education. In addition to assessing the effectiveness of the R&DU program as a problem-solving/dissemination arrangement, other major issues to be addressed by the Abt study include: (1) the management of inter-organizational relationships between various agencies that have the expertise and resources to assist schools in problem-solving; (2) the degree to which designed intervention programs can assist schools in overcoming basic barriers to successful problem-solving; (3) an assessment of what happens prior to and after R&D-based innovations have been adopted, and to examine whether or not these innovations have any persisting impact on schools; (4) the factors that may contribute to the institutionalization of the R&DU approach within various organizations; (5) the way in which linkage roles may serve

to coordinate the provision of external resources to schools and to increase or improve problem-solving behavior in schools; (6) the degree to which R&DU products meet the needs of local schools; and (7) the relative efficacy of the R&DU program approach as compared to approaches taken in other major dissemination efforts. Of particular interest to Abt are the inter-organizational linkages that facilitate R&D utilization by practitioners. The list below summarizes only the major types and sources of information Abt proposes to collect in their evaluation of the R&DU Program.

C) Characteristics of R&D distributors (i.e., linking agents and their support agencies) that hinder or facilitate successful delivery of R&D to practitioners

- Organizational support for linking agents
- Personality and role characteristics of linking agents

D) Use of R&D by educational information users (i.e., schools)

- Characteristics (e.g., organization structure, resources, reasons for change) of users that constrain or facilitate use of R&D)
- Extent and success of use of R&D

C → D) Communication of R&D from R&D distributors to R&D users

- Types and levels of tactics used by linking agents identified by case studies, questionnaires, and transaction logs
- Types of inter-organizational relationships that hinder or facilitate delivery of effective communication

There is some overlap between the types of information gathered by the Abt evaluation of the R&DU Program and "needs sensing" and "feedforward," though the primary focus of each (at least in theory) is different. Whereas the major concern of "needs sensing" is user needs for educational information and that of "feedforward" is (in theory) the communication of those user needs

to R&D producers (but in practice is turning out to be user needs), the main concern of the Abt evaluation is to gather information about the communication of R&D to practitioners, the characteristics/constraints of practitioners affecting R&D use, and the processes of problem identification, solution search, and R&D use. In addition, the Abt evaluation focuses on organizational characteristics and inter-organizational relationships that influence the success of delivery and use of R&D. Whereas the intended target (receiver) of needs sensing information is the manager of information services (deliverers), and the target of feedforward is the R&D producer (or funder), the primary targets of the Abt evaluation information include the practitioners ("to provide information to managers of change as to how external agencies, i.e., R&D disseminators such as linking agents, can help in school innovation") as well as the deliverers of R&D (i.e., linking agents) themselves.

Comparison of the SCB and RDU Evaluations

There are considerable similarities between the types of information collected by the SCB and RDU evaluation efforts: both focus on the characteristics of distributors (i.e., linking agents) influencing dissemination capability and use of R&D by educational practitioners. However, the Abt evaluation primarily emphasizes the communication and technical assistance tactics of R&D distributors and the characteristics and constraints of school-level practitioners affecting problem-solving and utilization, whereas the SCB evaluation is primarily concerned with collecting information on state education agency dissemination capability and extent of and satisfaction with any form of educational knowledge utilization, whether R&D-based or not. The Abt evaluation is more limited in the sense that users are restricted to school practitioners and the educational information being distributed is restricted to R&D outcomes (products, programs, processes, or information).

Although both evaluations tend to address dissemination issues that range from national to local, there appear to be important differences in relative emphasis. The SCB evaluation is especially concerned with questions of how to strengthem the role of and effort of state education agencies (SEAs) as leaders in statewide dissemination capacity building. This conception of capacity building includes issues such as how to coordinate various independent SEA dissemination activities, how to organize a comprehensive statewide resource base (both documentary and human) that is capable of responding to the full range of information needs of many different types of educational audiences, how to reach and provide for more effective two-way communication between the resource base(s) and users, how to provide more effective and useful information to users; and how to increase users' ability to obtain, interpret, and act on information they require for many different purposes. Because the SCB evaluation encompasses 29 states and must eventually deal with SEA-wide and statewide effects of the SCB projects, the study approach tends to be more extensive than intensive, with much information to be obtained through questionnaires, telephone interviews, and study of project documentation and information search and delivery records. Information about effects on users will generally be limited to what individual users can say about how they evaluated/used the information provided to them.

The RDU study also has a variety of levels of concern, e.g., comparison of the RDU program findings with findings of evaluation studies of other federally-sponsored dissemination programs, studying the inter-organizational relationships and their effects within each of the seven RDU projects, studying the linkage arrangements between the RDU project and school sites, and studying the effects of the project on problem-solving/R&D utilization processes and outcomes at school sites. However, it is perhaps the intensive

case-by-case examination of the history of RDU project linkages with specific school sites and the examination of the problem-solving and solution implementation process and outcomes at specific school sites that most starkly contrasts the RDU study from the SCB evaluation. While the SCB evaluation uses a brief mail questionnaire to obtain responses of a sample of several thousand persons who requested information or technical assistance, the RDU study focuses intensively on long-term (e.g., one to two years) series of transactions between the seven RDU projects and groups of instructional and administrative staff in each of perhaps a hundred school buildings. Building level, staff problem-solving, and solution selection and implementation are examined in detail, as well as the history of linking agent service transactions with these particular school staffs.

R&D System Monitoring

Whereas "needs sensing," "feedforward," and the evaluations of the R&DU Program and the State Capacity Building Program in each case focus on a particular aspect of the "user needs → R&D production and delivery → R&D use" cycle of educational dissemination, the concept and practice of "monitoring" involves the entire cycle at a systems level. The purpose of the Knowledge Production and Utilization system monitoring effort begun by NIE in FY 1974 is to collect systematically information about the structure, activities, funding, and communication flow of the knowledge-producing and -using systems in order to help inform decisions in those systems about operation or policy. Monitoring, then, is one level removed from the sensing and feedforward efforts; one could monitor, for example, the R&D-producing systems and the R&D-using systems to determine if feedforward or needs sensing or other methods of interface were occurring, and if so, how effective the interface was. Monitoring

can be used to identify problems or areas as aspects of a system (e.g., the RDx feedforward system) which require modifications, policy changes, or additional support.

Listed on pages 7 and 8 are several studies recently completed or in progress which developed conceptual frameworks or collected monitoring information on various aspects of the education R&D system. The following paragraphs provide further commentary on the content and relevance of these studies.

The Databook (Paisley, Butler, and Shapiro, 1976) provides a summary of available basic information on education research and development, including a statistical overview of the status of American education, a description of the sponsorship, coordination, and conduct of education R&D and a discussion of emerging factors. The two chapters in the Databook which directly address dissemination provide information (e.g., expenditures, activities, organization) on dissemination resources such as R&D journals, R&D conventions, federal network activities, programs in state departments of education, and state linkage facilities and programs. In the associated technical report, the authors conclude, however, that much needed data is unavailable, of questionable validity, or noncomparable from source to source. This finding dashed hopes that it would be relatively easy and inexpensive to organize quantitative information from existing data bases.

Consequently, NIE staff initiated systematic efforts to build a more reliable data base. The R&D funding studies (Nelson, Sowers, and Mason, 1977; Mason, Nelson, and Sowers, 1977; Nelson and Mason, 1977) examine federal support for education KPU by drawing on and reconciling data from several federal sources. These reports provide a detailed picture of how federal agencies and programs support different types of research functions and how

this support differs by types of problem areas, performing organizations, or target groups.

The American Registry of Research Organizations in Education project is intended to be a census effort that will assemble for the first time a nationwide picture of organizations that perform research, development, dissemination, and evaluation and policy studies (RDD&E) in the field of education. Questionnaires mailed to approximately 5,000 organizations seek general information describing:

- The purpose of the organization;
- The field in which it does RDD&E;
- How its education RDD&E is financed;
- The size of its RDD&E staff and their specialties;
- The typical number, size, and duration of its education RDD&E projects; and
- The media it uses to disseminate education RDD&E.

While these R&D system data-base building efforts were in progress, several NIE-sponsored field studies were completed.

Markley (1974, 1975) investigated the governance system of KPU activities in education and developed an analytical framework to examine how formal policy acts as a "regulator" of activities in KPU. After demonstrating the use of the framework in ten representative case studies, Markley made a series of recommendations that would help in the design of a monitoring program.

A series of studies by Radnor and associates at Northwestern began with an effort to draw implications for education KPU from experiences in research in agriculture, aerospace, and other areas (Spivak and Radnor, 1977; Radnor, Spivak, and Hofler, 1977). These led to a series of policy studies, including a general analysis (Radnor and Hofler, 1977), an analysis of the issue of field-initiated versus agency-directed RDD&E (Radnor, Spivak, and

Hofler, 1976), and an analysis of the policy implications of regionalism in RDD&E (Hofler, Radnor, and Spivak, 1977). The agency/field relationships analysis is especially significant for R&D system monitoring conceptualization because of its detailed analysis of the relationships of agency (NIE) purposes, RDD&E functions, and the systemic and environmental conditions that determine or condition the choice of agency strategies in relation to the field.

In the regionalism monograph, agency/field relationships are further examined from the standpoint of various conceptualizations of regionalism. This analysis is of substantial significance for sensing, monitoring, and feedforward because it confronts considerations of regionalism in terms of their relevance for needs identification, development, and especially dissemination. The authors make the point (p. 195) that each of these functions has the potential of being linked to and/or providing linkage between the various knowledge production (RDD&E) and knowledge utilization functions. Precisely because of their "linking" nature, each of these functions provides a natural mechanism for developing "regional cultures" of KPU collaboration.

This line of analysis relates closely to the latest monograph (Radnor, Hofler, and Rich, 1977), which is a collection of papers addressing conceptual and implementation issues of a regionally-based information dissemination and exchange system (RDx). Among the ten papers in this collection, the paper on monitoring information exchange (Chapter 9) is of direct relevance to R&D system monitoring. Several of the other papers also provide useful conceptual perspectives.

The Clark and Guba (1976) Studies of Productivity in Knowledge Production and Utilization (KPU) by Schools, Colleges, and Departments of Education explored the roles, activities, and productivity in R&D (e.g., journal articles

produced, grants received) of schools, colleges, and departments of education. Contextual factors within the SCDEs themselves and their parent institutions of higher education which affected individual and institutional decision-making were identified and examined.

Lotto and Clark (1978) reanalyzed and extended the Clark and Guba study to bring together for the first time a picture of the current effort being made by schools of education in dissemination and utilization. The study also considers the likely responses of colleges of education to alternative federal D&U intervention strategies.

This pair of reports provides a definitive picture of KPU in schools of education and also provides a highly useful model for the analysis of KPU roles and capabilities of other educational agencies (e.g., SEAs, ISAs, regional laboratories, and R&D centers).

Summary. R&D system monitoring, as represented by the studies cited above, is a complex and evolutionary enterprise. Major problems exist because the conception of education KPU is evolving and is subject to many different interpretations and perspectives. With some exceptions (e.g., federal funding) there are still few means to accomplish systematic collection of quantitative and qualitative data to describe the major dimensions of KPU, and it is therefore not possible to assess accurately the dimensions themselves, the interactions among dimensions at one point in time, or their dynamic relationships over periods of time. However, as the studies cited above indicate, significant steps have been taken toward KPU monitoring in education.

If continued, R&D system monitoring, in its broadest sense of conceptualization, measurement, analysis, and interpretation, will provide the intelligence

system framework for organizing data from a variety or more specialized efforts, such as those associated with sensing, feedforward, and evaluations of specific programs.

SUMMARY OF COMPARISON OF SENSING, FEEDFORWARD, MONITORING, ABT EVALUATION, AND NTS EVALUATION

Although these five efforts to gather information about the educational information dissemination process are independent, focus on somewhat different aspects of the dissemination process, and incorporate different terminologies, methods, and philosophies, it is apparent from the preceding descriptions that these efforts have considerable overlap in the purposes and types of information collected. Because the information collected by one effort might prove useful to some of the other efforts, communication among efforts could be useful. Information services (especially ERIC) have informal ongoing needs sensing; perhaps coordination among information services and the somewhat more structured RDx feedforward system could produce a more efficient ongoing system for influencing R&D production and delivery through user needs information. Although the two evaluation efforts (Abt and NTS) are fixed-duration studies, the data collection methods could be continued by local (or state) personnel (involved in R&DU and State Capacity Building efforts) to contribute to a permanent information-gathering system or network. "Monitoring" would then entail the responsibility of evaluating and improving the functioning of this coordinated system.

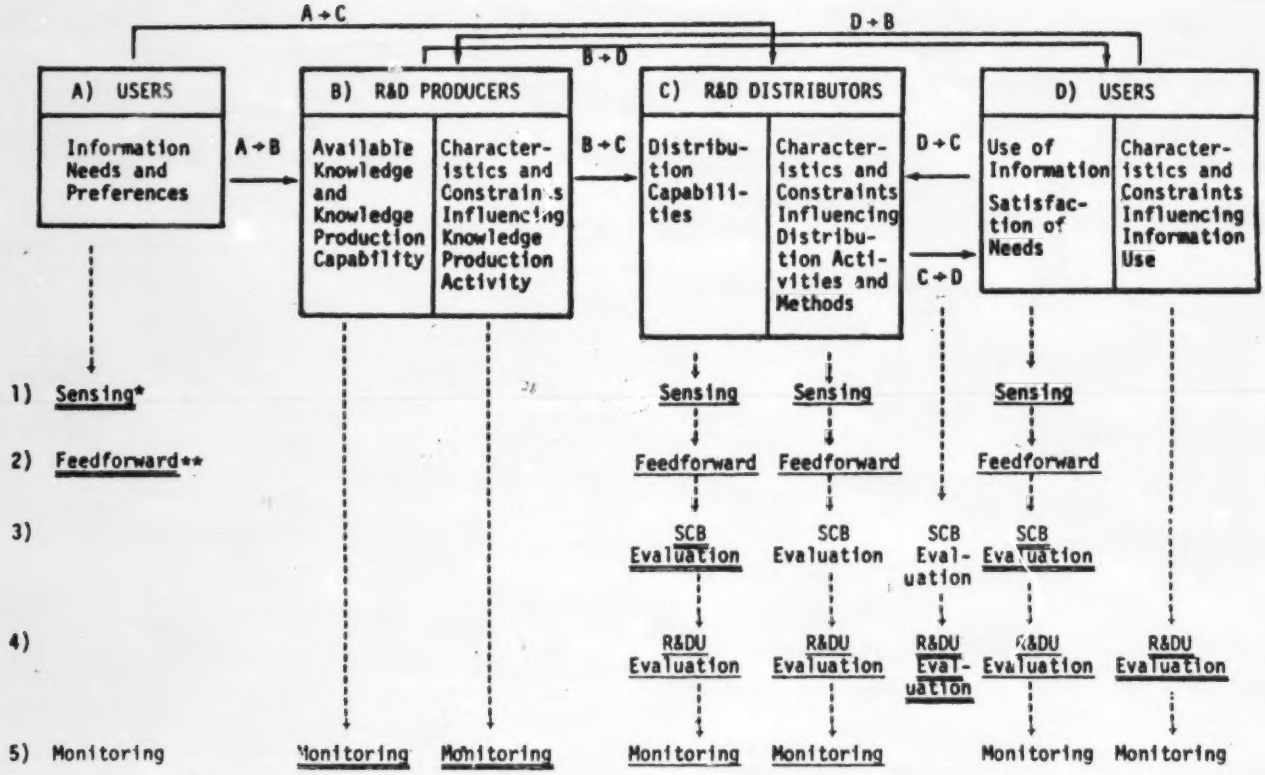
Although all five efforts aim to gather information, the two evaluations and, potentially, the R&D system monitoring studies are distinguished from information needs sensing and feedforward by their explicit commitment to creating conceptual frameworks for the collection, analysis, and interpretation of collected data and information. In our opinion, information needs sensing and feedforward efforts are both remarkably deficient in this respect. Because the SCB evaluation encompasses most of the information needs sensing

concerns, it may be that the evolving SCB evaluation framework (e.g., NTS Research Corporation, 1978) may eventually provide a more conceptually sound and systematic basis for other information needs sensing activities. The Abt study of RDU promises to serve a highly similar function for feedforward activities, since this study explicitly includes a commitment to communicate findings regarding R&D utilization by schools to various policy, governance, and practitioner audiences. As we have noted, the Radnor et al. studies (e.g., Radnor, Hofler, and Rich, 1977; Hofler, Radnor, and Spivak, 1977) also serve to provide a conceptual basis for the entire range of R&D Exchange activities, including those concerned with feedforward. By labeling each of these five efforts as an "intelligence" activity, we have attempted to imply that they are all inherently concerned with communicating to others interpreted or evaluated information (see definitions, p. 2). However, both sensing and feedforward, and perhaps to some degree R&D system monitoring (but see Churchhill, 1974) activities, suffer from the lack of a more coherent conceptualization regarding purposes, audiences, sources, and kinds of data required, but mostly regarding methods for analysis, interpretation, and evaluation that would convert data and information into effective "intelligence" for proposed target audiences.

Some of the information collected by these efforts would be worth sharing with the other efforts. Figures 2 and 3 are attempts to summarize the information concerns of the five efforts so that comparisons can be more easily made. Figure 2 illustrates the primary and secondary foci of each of the five efforts in terms of the components or actors in the information dissemination process. It can be seen that the information concerns of "needs sensing" and "feedforward" are quite similar in practice (both focusing on user needs),

Figure 2

PRIMARY AND SECONDARY FOCI OF THE SENSING, FEEDFORWARD, MONITORING, AND EVALUATION EFFORTS (AS THEY ARE PRACTICED) IN THE INFORMATION FLOW SEQUENCE OF THE DISSEMINATION PROCESS



Monitoring focuses on the entire knowledge production/utilization system (including funding, agencies, personnel, communication channels, and information flow).

* Two underlines indicate primary focus; one underline indicates secondary focus.

** In theory, the primary focus of feedforward would be the communication of user needs to R&D producers (A→B) and the communication of R&D from producers to users (B→D), but in practice the emphasis is quite different.

Figure 3

CHARACTERISTICS OF THE SENSING, FEEDFORWARD, MONITORING, AND EVALUATION INFORMATION-COLLECTION EFFORTS (AS THEY ARE PRACTICED)

	PRIMARY FOCUS	SECONDARY FOCUS	SOURCES OF INFORMATION	TARGET OF INFORMATION	PURPOSE OF INFORMATION
NEEDS SENSING	Information needs of users	Characteristics and capacity of distributors, use of information by users	ERIC users, managers of ERIC, and other information services	Managers of information services	To increase usefulness and use of ERIC and other information bases
FEEDFORWARD*	Information needs of practitioners	Characteristics and capacity of R&D distributors, use of R&D by practitioners	ISAs, SEAs	Untargeted, but apparently labs, centers, and state education agencies	To influence R&D producers to produce R&D more useful to practitioners
ABT EVALUATION OF R&DU	Communication of R&D from distributors to users, characteristics of users influencing R&D use	Characteristics and capacity of R&D distributors, use of R&D by practitioners	Local practitioners (schools), linking agents	Intermediate agencies (linking agents), practitioners, federal policymakers and program managers	To improve use of linking agents in helping practitioners select and use R&D
NTS EVALUATION OF STATE CAPACITY BUILDING	Capacity of distributors; use of and satisfaction with use of various forms of information	Characteristics of distributors, communication of information from distributors to users	SEA managers, wide range of educational information users	Those charged with making funding and development policy decisions on state dissemination systems	To evaluate effectiveness of State Capacity Building Program, to inform decisions on policy and planning of Capacity Building
MONITORING	Resources for, structure and functioning of entire KPU system, including dissemination		R&D sponsors, performers, disseminators, and users	Those charged with making funding and development policy and R&D decisions on the dissemination system.	To identify areas of the system in need of support, to inform policy decisions about system

* The information in this row refers to the feedforward system as it is now being practiced. To fulfill the purposes of the "feedforward" concept, the information to be collected would be somewhat different; the "feedforward" row would probably be as follows:

	PRIMARY FOCUS	SECONDARY FOCUS	SOURCES OF INFORMATION	TARGET OF INFORMATION	PURPOSE OF INFORMATION
FEEDFORWARD	Communication of user needs from users to R&D producers	Character of communication of R&D from R&D producers to users, use of R&D	School practitioners, R&D producers, R&D disseminators	Those charged with making decisions about funding and directions for R&D production and dissemination	To influence producers of R&D to produce and deliver more relevant and useful R&D, to increase practitioner use of R&D.

though the concept of feedforward is more concerned with the communication of those needs from user to R&D producer. As can be seen in Figure 3, feedforward (at least in theory) in more narrowly targeted than needs sensing in several ways: (1) the only information users of concern are school practitioners; (2) R&D outcomes and validated practices are the only educational information of concern; and (3) there is greater potential for affecting production and delivery functions of R&D through communication of practitioner needs to educational R&D sponsors, performers, trainers, and linkers.

Given the ultimate goal of influencing R&D producers to be more responsive to educational information uses and to increase R&D use by and usefulness to practitioners, there are two aspects of Figure 2 that are particularly striking: (1) all the efforts collect information from R&D distributors (e.g., linking agents, ERIC, SEAs), but only monitoring collects information about capability, constraints, organization, preferred content, etc., from R&D producers; and (2) with the exception of the Abt evaluation of R&DU, which collects information on inter-organizational linkages and the methods and tactics linking agents use to communicate R&D to practitioners, there is little if any study of the communication (e.g., effective methods, styles) of either user needs to R&D performers or information/R&D from R&D performers to users. Most of the efforts focus their attention solely on the "components" or performers in the dissemination process, rather than on the dynamic interactions among them. This deficiency would seem to be serious, given the goal of influencing the flow of information in the dissemination process.

We trust that the comparisons made in this paper among these major efforts to gather information about the dissemination process will prove useful to those attempting to identify overlaps and gaps in information derived from

these efforts. Perhaps the paper can also stimulate ideas about possible coordination among efforts in establishing a system or systems for ongoing information-gathering.

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